**Fluorimetric techniques for assessment of sperm membranes**

The maintenance of sperm viability and fertilization potential depends on multiple factors, including membrane integrity and intracellular functionality. Standard spermiograms describing sperm quality are mostly based on physiological and visual parameters, such as ejaculate volume and concentration, motility and progressive motility, and sperm morphology. However, such an evaluation does not take into account other cellular and functional parameters. Therefore, additional and accurate methods are required to ensure semen quality.

In the current paper we described two feasible methodologies to evaluate sperm quality based on sperm cell membrane integrity and cellular features associated with sperm fertilization competence. The first, is simultaneous quadruple staining with specific fluorescent probes, combined with fluorescence microscopy. The second, is advanced sperm-dedicated flow cytometry. Analysis include evaluation of plasma and acrosome membrane integrity as well as mitochondrial membrane potential. Combination of methods are also presented. For instance, annexin V assay combined with PI fluorochromes are used to assess apoptosis and the proportion of apoptotic sperm (apoptotic index).

In our recent studies, using these techniques, we were able to examine the effects of foodborne toxins on sperm quality. We believe that these methodologies, which based on sperm membrane examination, provide a powerful tool to evaluate semen quality and fertilization competence.